

F1  
[tropoelastin] biomaterial in an amount which will cause fusing together of one of said first and second outer surfaces of the [tropoelastin] biomaterial and one of said first and second outer surfaces of said tissue substrate, said energy absorbing material penetrating into the interstices of said [tropoelastin] biomaterial;

irradiating the energy absorbing material with light energy in said predetermined wavelength range with an intensity sufficient to fuse together one of said first and second outer surfaces of the [tropoelastin] biomaterial and the tissue substrate; and

fusing together the selected one of said first and second outer surfaces of the [tropoelastin] biomaterial and the tissue substrate.

2. (Amended) The method of claim 1, which further includes the step of indirectly irradiating said energy absorbing material by directing the light energy first through the [tropoelastin] biomaterial or tissue substrate and then to the energy absorbing material.

3. (Amended) The method of claim 1, wherein said energy absorbing [Material] material comprises a biocompatible chromophore.

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5. (Amended) The method of claim 1, which further includes the step of substantially dissipating said energy absorbing material when said [tropoelastin] biomaterial and said tissue substrate are fused together.

6. (Amended) The method of claim 1, which further includes the step of staining the first or second surface of said [tropoelastin] biomaterial with said energy absorbing material.

7. (Amended) The method of claim 1, which further includes the step of applying said energy absorbing material to one of said outer surfaces of said biomaterial by doping a separate [tropoelastin] doped biomaterial layer with an energy absorbing material, and then fusing the [doped] separate [tropoelastin] doped biomaterial layer to the [tropoelastin] biomaterial.

8. (Amended) The method of claim 1, wherein the energy absorbing layer is substantially uniformly applied to a selected one of said first and second outer surfaces of the [tropoelastin] biomaterial.

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EX  
9. (Amended) The method of claim 1, which further includes the step of covering substantially the entire outer surface of the [tropoelastin] biomaterial with the energy absorbing material.

10. (Amended) The method of claim 1, which further includes the step of irradiating the energy absorbing material with light energy at a localized temperature of from about 40 to 600 degrees C. for period of time sufficient to cause fusing together of one of said first and second outer surfaces of the [tropoelastin] biomaterial and one of said first and second outer surfaces of said tissue substrate.

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EX  
12. (Amended) The method of claim 1, wherein the average thickness of the energy absorbing material which penetrates into the interstices of the [tropoelastin] biomaterial is from about 0.5 to 300 microns.

13. (Amended) The method of claim 1, which further includes the step of arranging the magnitude of the wave length, energy level, absorption, and light intensity during irradiation with light energy of the energy absorbing material, and the concentration of the energy absorbing material, so that the localized temperature at the interface of said first and second outer surfaces of the [tropoelastin] biomaterial and the tissue substrate are maintained at from about 40 to 600 °C., thereby fusing together the [tropoelastin] biomaterial and the tissue substrate.

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EX  
16. (Amended) The method of claim 1, which further includes the step of forming [an tropoelastin] said biomaterial into a three-dimensional support structure wherein said [tropoelastin material] biomaterial is combined with a stromal support matrix populated with actively growing stromal cells.

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EX  
18. (Amended) The method of claim 1, which further includes the step of forming a cellular lining of human cells on one of the major surfaces of said [tropoelastin] biomaterial layer.

19. (Amended) The method of claim 1, wherein said cells which are employed to form [such a] said cellular lining are at least one of endothelial cells, epithelial cells and urothelial cells.

~~22~~ 20. (Amended) The method of claim 1, which further includes the step of forming an [tropoelastin biocompatible] inner lining consisting essentially of tropoelastin for mechanical human structures to ensure their continued internal use in a human body.

~~22~~ 21. (Third Amendment) The method of claim 20, which further includes the step of forming [a tropoelastin biocompatible] said inner lining in heart valves, heart implants, dialysis equipment, or oxygenator tubing for heart-lung by-pass systems.

~~22~~ 23. (Third Amendment) A method for using a [tropoelastin] biomaterial as a tissue-fusible layer, comprising:

~~22~~ providing a layer of [tropoelastin] biomaterial having a first and second outer major surface;  
providing a tissue substrate having a first and second outer major surface; and  
using said [tropoelastin] said biomaterial as a heat fusible material by applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to one of said first and second outer surfaces of the [tropoelastin] biomaterial in an amount which will make said [tropoelastin] biomaterial tissue-fusible, and which will cause fusing together of one of said first and second outer surfaces of the [tropoelastin] biomaterial and one of said first and second outer surfaces of said tissue substrate, said energy absorbing material being applied so that it will penetrate into the interstices of said [tropoelastin] biomaterial,  
irradiating the energy absorbing material with light energy in said predetermined wavelength range with an intensity being sufficient to fuse together one of said first and second outer surfaces of the [tropoelastin] biomaterial and the tissue substrate.

~~22~~ 24. (Twice Amended) A method for producing [an tropoelastin] a biomaterial consisting essentially of tropoelastin fused onto a tissue substrate comprising:

~~22~~ providing a layer of [tropoelastin] said biomaterial having a first and second outer major surface and a tissue substrate having a first and second outer major surface;  
applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to one of said first and second outer surfaces of the [tropoelastin]

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biomaterial in an amount which will cause fusing together of one of said first and second outer surfaces of the [tropoelastin] biomaterial and one of said outer surface of said tissue substrate, said energy absorbing material penetrating into the interstices of said [tropoelastin] biomaterial;

indirectly irradiating the energy absorbing material by directing the light energy first through the [tropoelastin] biomaterial or tissue substrate and then to the energy absorbing material, said light energy being in said predetermined wavelength range with an intensity sufficient to fuse together one of said first and second outer surfaces of the [crosslinked tropoelastin] biomaterial and the outer surface of said tissue substrate; and

fusing together one of said first and second outer surfaces of the [crosslinked tropoelastin] biomaterial and the outer surface of said tissue substrate and substantially dissipating said energy absorbing material when said [crosslinked tropoelastin] biomaterial and said tissue substrate are fused together.

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36. (Amended) A method for producing a prosthetic device comprising:  
providing a biomaterial layer consisting essentially of tropoelastin [biomaterial] and a support member comprising a stent, a conduit or a scaffold; and  
applying said layer of [consisting essentially of tropoelastin] biomaterial to said support member to form said prosthetic device.

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42. (Amended) The method of claim 36, which includes the step of [attaching] applying said [sheet] biomaterial layer to said support by grafting.

43. (Amended) The method of claim 36, which includes the step of [attaching] applying said [sheet] biomaterial layer to said support by mechanical bonding.

E13  
F4  
44. (Twice Amended) The method of claim 36, which includes the step of [attaching] applying said [sheet] biomaterial layer to said support by laser bonding.

45. (Twice Amended) The method of claim 36, which includes the step of incorporating a drug into said biomaterial layer [of tropoelastin material] thereby decreasing the need for systemic intravenous or oral medications.

47. (Twice Amended) A method for producing a [tropoelastin] biomaterial, which comprises:

E14  
F4  
providing a polymerizable monomer consisting essentially of [tropoelastin];  
polymerizing said [tropoelastin] polymerizable monomer to form a polymer consisting essentially of [tropoelastin]; and  
forming [a biocompatible tropoelastin] said biomaterial from said [tropoelastin] polymer.

E15  
F4  
48. (Fourth Amended) The method of claim [47] 100, wherein the tissue substrate is selected from a group consisting of bladders, intestines, tubes, esophagus, ureters, arteries, veins, stomachs, lungs, hearts, colons, and skin.

49. (Third Amended) The method of claim [47] 100, which further includes the step of forming a three-dimensional support structure wherein said [tropoelastin] material is combined with a stromal support matrix populated with actively growing stromal cells.

E16  
F4  
51. (Third Amended) The method of claim 47, which further includes the step of forming a cellular lining of human cells on one of the major surfaces of said [biocompatible tropoelastin] biomaterial.

P4  
E17  
53. (Twice Amended) The method of claim [47] 100, which further includes the step of forming [a tropoelastin biocompatible] an inner lining for mechanical human structures to ensure their continued internal use in a human body.

54. (Third Amended) The method of claim [47] 100, which further includes the step of forming [a tropoelastin biocompatible] an inner lining in heart valves, heart implants, dialysis equipment, or oxygenator tubing for heart-lung by-pass systems.

74. (Twice Amended) A method for producing a biomaterial consisting essentially of tropoelastin [capable of being fused onto] joined to a tissue substrate comprising:

providing a layer of said biomaterial [consisting essentially of tropoelastin] having a first and second outer major surface; and

applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to a selected one of said first and second outer surfaces of the [tropoelastin] biomaterial in an amount which will cause fusing together of one of said first and second outer surfaces of the [tropoelastin] biomaterial and an outer surface of said tissue substrate, said energy absorbing material penetrating into the interstices of said [tropoelastin] biomaterial,

the selected one of said first and second outer surfaces of the [tropoelastin] biomaterial being capable of [fusing] joining together with the outer surface of the tissue substrate by irradiating the energy absorbing material with light energy in a predetermined wavelength range with an intensity sufficient to facilitate said [fusing] joining together of said biomaterial and said tissue substrate..

76. (Amended) A method for producing a biomaterial consisting essential of tropoelastin fused onto a tissue substrate comprising:

providing a layer of [a] said biomaterial [consisting essential of tropoelastin] having a first and second outer major surface and a tissue substrate having a first and second outer major surface; and

76  
applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to a selected one of said first and second outer surfaces of the [tropoelastin] biomaterial in an amount which will cause fusing together of one of said first and second outer surfaces of the [tropoelastin] biomaterial and one of said first and second outer surfaces of said tissue substrate, said energy absorbing material penetrating into the interstices of said [tropoelastin] biomaterial;

irradiating the energy absorbing material with light energy in said predetermined wavelength range with an intensity sufficient to fuse together one of said first and second outer surfaces of the [tropoelastin] biomaterial and the tissue substrate; and

77  
fusing together the selected one of said first and second outer surfaces of the [tropoelastin] biomaterial and the tissue substrate.

77. (Amended) The method of claim 76, which further includes the step of indirectly irradiating said energy absorbing material by directing the light energy first through the [tropoelastin] biomaterial or tissue substrate and then to the energy absorbing material.

78. (Amended) The method of claim 76, wherein said energy absorbing [Material] material comprises a biocompatible chromophore.

79  
80. (Amended) The method of claim 76, which further includes the step of substantially dissipating said energy absorbing material when said [tropoelastin] biomaterial and said tissue substrate are fused together.

81. (Amended) The method of claim 76, which further includes the step of staining the first or second surface of said [tropoelastin] biomaterial with said energy absorbing material.-

82. (Amended) The method of claim 76, which further includes the step of applying said energy absorbing material to one of said outer surfaces of said biomaterial by doping a separate [tropoelastin] biomaterial layer with an energy absorbing material, and then fusing the doped separate [tropoelastin] biomaterial layer to the [tropoelastin] biomaterial.

83. (Amended) The method of claim 76, wherein the energy absorbing layer is substantially uniformly applied to a selected one of said first and second outer surfaces of the [tropoelastin] biomaterial.

84. (Amended) The method of claim 76, which further includes the step of covering substantially the entire outer surface of the [tropoelastin] biomaterial with the energy absorbing material.

85. (Amended) The method of claim 76, which further includes the step of irradiating the energy absorbing material with light energy at a localized temperature of from about 40 to 600 degrees C. for period of time sufficient to cause fusing together of one of said first and second outer surfaces of the [tropoelastin] biomaterial and one of said first and second outer surfaces of said tissue substrate.

87. (Amended) The method of claim 76, wherein the average thickness of the energy absorbing material which penetrates into the interstices of the [tropoelastin] biomaterial is from about 0.5 to 300 microns.

88. (Amended) The method of claim 76, which further includes the step of arranging the magnitude of the wave length, energy level, absorption, and light intensity during irradiation with light energy of the energy absorbing material, and the concentration of the energy absorbing material, so that the localized temperature at the interface of said first and second outer surfaces of the [tropoelastin] biomaterial and the tissue substrate are maintained at from about 40 to 600 °C., thereby fusing together the [tropoelastin] biomaterial and the tissue substrate.

89. (Amended) The method of claim 76, wherein [the tissue substrate] so that the tissue substrate is a live tissue substrate.

91. (Amended) The method of claim 76, which further includes the step of forming an [tropoelastin] into a three-dimensional support structure wherein said [tropoelastin] material is combined with a stromal support matrix populated with actively growing stromal cells.



92. (Amended) The method of claim [76] 91, wherein a stromal support matrix comprises fibroblasts.

93. (Amended) The method of claim 76, which further includes the step of forming a cellular lining of human cells on one of the major surfaces of said [tropoelastin] biomaterial layer.

95. (Amended) The method of claim 76, which further includes the step of forming an [tropoelastin biocompatible] inner lining of said biomaterial for mechanical human structures to ensure their continued internal use in a human body.

96. (Amended) The method of claim [20] 95, which further includes the step of forming [a tropoelastin biocompatible] said inner lining in heart valves, heart implants, dialysis equipment, or oxygenator tubing for heart-lung by-pass systems.

98. (Amended) A method for using a [tropoelastin] biomaterial consisting essentially of tropoelastin as a tissue-fusible layer, comprising:

providing a layer of a biomaterial consisting essentially of tropoelastin [biomaterial] having a first and second outer major surface which is useable as a tissue-fusible material;

providing a tissue substrate having a first and second outer major surface; and

applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to one of said first and second outer surfaces of the [tropoelastin] biomaterial in an amount which will make said [tropoelastin] biomaterial tissue-fusible, and which will cause fusing together of one of said first and second outer surfaces of the [tropoelastin] biomaterial and one of said first and second outer surfaces of said tissue substrate, said energy absorbing material being applied so that it will penetrate into the interstices of said [tropoelastin] biomaterial,

irradiating the energy absorbing material with light energy in said predetermined wavelength range with an intensity being sufficient to fuse together one of said first and second outer surfaces of the [tropoelastin] biomaterial and the tissue substrate.

99. (Amended) A method for producing an [tropoelastin] biomaterial fused onto a tissue substrate comprising:

providing a layer consisting essentially of [tropoelastin] biomaterial having a first and second outer major surface and a tissue substrate having a first and second outer major surface;

applying an energy absorbing material, which is energy absorptive within a predetermined range of light wavelengths, to one of said first and second outer surfaces of the [tropoelastin] biomaterial in an amount which will cause fusing together of one of said first and second outer surfaces of the [tropoelastin] biomaterial and one of said outer surface of said tissue substrate, said energy absorbing material penetrating into the interstices of said [tropoelastin] biomaterial;

indirectly irradiating the energy absorbing material by directing the light energy first through the [tropoelastin] biomaterial or tissue substrate and then to the energy absorbing material, said light energy being in said predetermined wavelength range with an intensity sufficient to fuse together one of said first and second outer surfaces of the crosslinked [tropoelastin] biomaterial and the outer surface of said tissue substrate; and

fusing together one of said first and second outer surfaces of the crosslinked [tropoelastin] biomaterial and the outer surface of said tissue substrate and substantially dissipating said energy absorbing material when said crosslinked [tropoelastin] biomaterial and said tissue substrate are fused together.

Add new claims 100-104, as follows:

--100. The method of claim 47, wherein said tropoelastin biomaterial is attached to a tissue substrate.--

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--101. A method for producing a tropoelastin biomaterial, which comprises:  
providing a monomer consisting essentially of tropoelastin;  
polymerizing said tropoelastic monomer to form a polymer consisting essentially of tropoelastin;  
forming a biocompatible tropoelastin biomaterial from said tropoelastin polymer; and  
forming a three-dimensional support structure wherein said tropoelastin biomaterial is combined with a stromal support matrix populated with actively growing stromal cells.--

--102. The method of claim 101, wherein the stromal support matrix comprises fibroblasts.--

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--103. A method for producing a tropoelastin biomaterial, which comprises:  
providing a monomer consisting essentially of tropoelastin;  
polymerizing said tropoelastic monomer to form a polymer consisting essentially of tropoelastin;  
forming a tropoelastin biomaterial from said tropoelastin polymer; and  
a cellular lining of human cells on one of the major surfaces of said tropoelastin biomaterial.--

--104. The method of claim 103, wherein said human cells are selected from a group consisting of endothelial cells, epithelial cells and urothelial cells.--

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REMARKS

Attorney for Applicants wishes to thank Examiner Prebilic for the courtesies extended to him at the recent personal interview at his office in the USPTO.

Claims 48 has been rejected under 35 U.S.C § 112, second paragraph. Claim 48 has been amended to depend same from new claim 100 thereby overcoming any antecedent basis problem.